REMARKS

An Excess Claim Fee Payment of $1,250.00 for five (5) additional independent claim(s) ($1,000.00), and for five (5) additional claims in excess of twenty (20) total claims, ($250.00) is included herewith.

Claims 1-79 are presently pending in this application. Claims 1-2, 4-13, 15-30, 32-39, 41-49, 51-53, 55-58, 60-63, 65-70 and 72-73 have been amended to more particularly define the claimed invention. Claims 75-79 have been added to claim additional features of the claimed invention.

It is noted that the amendments are made only to more particularly define the invention and **not** for distinguishing the invention over the prior art, for narrowing the scope of the claims, or for any reason related to a statutory requirement for patentability. It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Applicant gratefully acknowledges the Examiner's indication that claims 2-3, 8, 11-14, 28-31, 40, 44, 47-50, 58-59, 64, 67-68 and 73-74 would be allowable if rewritten in independent form. Applicant has included the allowable subject matter of claims 2, 28, 40, 58 and 73 into new independent claims 75-79, respectively. However, Applicant submits that all of the claims are allowable.

Claims 1, 4-7, 9-10, 15-17, 21-27, 32-34, 38-39, 41-43, 45-57, 60-63, 65-66 and 69-72 stand rejected under 35 U.S.C. §102(e) as being anticipated by Chow et al., U.S. Pat. App. Pub. No. 2002/0145776.

Claims 18-20, 35-37 and 52-56 stand rejected under 35 U.S.C. §103(a) as being

unpatentable over Chow et al., U.S. Pat. App. Pub. No. 2002/0145776.

These rejections are respectfully traversed in view of the following discussion.

I. APPLICANT'S CLAIMED INVENTION

The claimed invention (as defined, for example, by independent claim 1) is directed to an optical signal transmission system including at least one optical signal transmitter and at least one optical signal receiver, wherein the at least one optical signal transmitter generates at least one optical identifier belonging to and being different in wavelength from at least one main optical signal, wherein the at least one optical signal transmitter performs a wavelength-multiplexing of the at least one main optical signal and the at least one optical identifier to transmit at least one wavelength-multiplexed optical signal to the at least one optical signal receiver, wherein the at least one optical signal receiver performs a wavelength-demultiplexing of the at least one wavelength-multiplexed optical signal to generate the at least one main optical signal and the at least one optical identifier, and wherein the at least one optical signal receiver further verifies whether a correct transmission route is established, based on the at least optical identifier with reference to at least one set of corresponding data, which include a first relationship in correspondence between the at least one main optical signal and the at least one optical identifier.

Conventionally, methods of monitoring the correspondence between a signal transmitter and a signal receiver in a wavelength-multiplexed optical network utilize pilot tone signals superimposed as identifiers to the main optical signals and assigned with frequencies specific to wavelengths of main optical signals to monitor a set state of an optical path and an optical signal level. The superimposition of the pilot tone signal over the main

optical signal causes not only deterioration in carrier-to-noise ratio of the pilot tone signal, but also deterioration in quality of the main optical signal. Consideration of only the presence or the absence of the pilot tone signal may provide undesired limitations to a maximum value of a transmittable distance of the main optical signal and another maximum value of a transmission rate of the main optical signal. (Application at page 3, lines 6-21.)

The claimed invention (e.g., as recited in claims 1, 21, 38, 57, 71 and 72), on the other hand, includes *wherein said at least one optical signal receiver further verifies whether a correct transmission route is established, <u>based on said at least optical identifier with reference to at least one set of corresponding data, which include a first relationship in correspondence between said at least one main optical signal and said at least one optical identifier</u>*. This feature of the claimed invention is important to provide a system capable of monitoring a correct connection or route established in a wavelength-multiplexed optical network or an optical switch between a signal transmission side and a signal receiving side, independently from both an optical signal transmission rate and a transmission optical signal format, and without any substantive deterioration in quality of a main optical signal, and without any photoelectric conversion of the main optical signal. (Application at page 4, lines 5-11.)

II. THE ALLEGED PRIOR ART REJECTIONS

A. The 35 U.S.C. § 102(e) Rejection over Chow et al., U.S. Pat. App. Pub. No. 2002/0145776

The Examiner alleges that Chow et al., U.S. Pat. App. Pub. No. 2002/0145776, (Chow), teaches the invention of claims 1, 4-7, 9-10, 15-17, 21-27, 32-34, 38-39, 41-43, 45-57, 60-63, 65-66 and 69-72.

Applicant submits, however, that Chow does not teach or suggest, "*wherein said at least one optical signal receiver further verifies whether a correct transmission route is established, based on said at least optical identifier with reference to at least one set of corresponding data, which include a first relationship in correspondence between said at least one main optical signal and said at least one optical identifier*," of independent claims 1, 21, 38, 57, and 71-72.

Chows discloses a marker channel 132 that indicates the presence of a code overlaid (an overlay code) across the data channels 130, e.g., channel 11 in Fig. 5.

> [0061] FIG. 5 is a waveform diagram of the coding technique used for optical processing which will be explained below. Each of the waveforms in FIG. 5 represent different data channels 130 which are encoded at different light wavelengths carried by the fiber optic cable 82 in FIG. 4. By way of example, the data channels 130 are designated channels 12 in FIG. 5 and represent data packets which are modulated at different light wavelengths. In practice, there may be many more data packets depending on the number of distinct wavelengths which may be multiplexed using the DWDM method. In this example, data channel 11 is the channel of interest and has coding such as traffic data carried by itself and the other data channels 1-10. Thus, the address code is 11 bits in this example. An additional marker channel 132 indicates the presence of a code overlaid across the data channels 130. The 11 bits of code in this example contains directive information only for channel 11 but multiple channels can also be simultaneously directed with one code word if the respective start points of such channels are properly matched in time. (Emphasis added.)

The marker channel 132 is an optical channel separate from the only one of the other data channels 1-11 and carries a pulse identifying the leading edge of the optical data packet (overlay code) on the data channel.

> [0062] The overlay code may be coded by either gain or attenuation encoding on the data channels 130. In positive gain encoding shown in FIG. 5, the ONE bits of optical data are encoded by a slight gain increase in that particular optical channel. In negative attenuation encoding, ONE bits are encoded by slight attenuations of that particular optical channel. ZERO bits are encoded by not modifying the gain of a specific optical channel in either method. The choice of positive or negative encoding means is determined by the hardware

> set available at a node. The marker channel 132 is a special optical channel reserved for carrying a synchronous pulse that corresponds to the leading edge of the specific optical data packet being encoded. (Emphasis added.)

The data packet 134 containing the overlay code has a header portion 136 that contains permanent codes distinct from the overlay codes, and a data portion 138 that carries the data in the packet.

> [0067] Each data channel is otherwise a conventional optical data packet. For example, a data packet 134 in channel 11 is the data packet of interest. The data packet 134 has a header portion 136 which contains permanent codes such as framing, packet type (i.e. ATM, IP), source and destination, error correction, synchronization, status, addressing, identification and control codes related to the data packet in a serial format. Unlike the overlay codes, the header codes are part of the data and do not change when the packet is sent over the network. The header portion 136 precedes a data portion 138 which carries the actual data in the packet. (Emphasis added.)

The optical packet enters the optical buffer loop of Fig. 7 which reads the overlay code and decides how the packet should be routed.

> [0068] Just before reaching the next destination node, the optical packet in FIG. 5 enters an optical buffer loop which reads the parallel overlay code and decides if the packet should proceed directly into the add-drop node such as router 112 or a cross connect node such as router 114 in FIG. 4 or is buffered in an optical buffer loop. (Emphasis added.)

An optical address detector array 150 as shown in Fig. 6 wherein each channel 1-11 has a detector unit 152-172. Each detector unit has a reference detector 176 that are tuned to the wavelength of the marker channel 132 of Fig. 5.

> [0071] An optical address detector array 150 is shown in FIG. 6 which is constructed from basic sensor building blocks such as the optical detector 10 shown in FIG. 1. As explained above, the detectors in the optical address detector array may have load resistors similar to the load resistor 17 in FIG. 1. These components are not shown in FIG. 6 for simplicity of illustration. The optical address detector array 150 has a number of optical detector units 152, 154, 156, 158, 160, 162, 164, 166, 168, 170 and 172. Each optical detector unit 152-172 detects either a ONE or a ZERO bit. In the detector array 150, the detector unit 152 (and detector units 156, 160, 162, 166 and 170) detects a ONE bit and has a photo detector 174 which is preferably a NiP photodiode

> coupled to <u>a reference detector 176</u> which is preferably a PiN photodiode. The photo detector 174 has an optical wavelength filter 178 which is attuned to a specific wavelength of light. The reference detector 176 has an optical wavelength filter 180 which is attuned to a second specific wavelength of light. The use of an optical filter provides wavelength selectivity but other light demultiplexing means such as gratings or spectrometers can be used to separate the incoming DWDM optical signals and direct the signals to the appropriate detector units. (<u>Emphasis added</u>.)

It is then determined if the channels 1-11 have the proper overlaid code, when the overlaid code of the particular channel matches the destination of the optical detector array 150.

> [0077] Each detector unit 152-172 is tuned to the wavelength of a particular data channel corresponding, for example, to the data channels 1-11 in FIG. 5. The detector units 152-172 are wired together at their respective output terminals such as an output terminal 194 of the detector unit 152 to the output terminal of the next detector unit such as terminal 196 of the detector unit 154. The complementary end output of the array 150 has an output terminal 198 which provides an output signal. As will be explained below, each of the photodetectors of the detector units 152-172 is tuned to a particular bit value represented by the light wavelength in a corresponding channel. <u>All of the reference detectors of the detector units 152-172 are tuned to the wavelength of the marker channel 132 in FIG. 5</u>. <u>If all of the channels have the proper code, a zero error signal will be output on the output terminal 198 allowing a processor to determine that the overlaid code of the particular channel matches the destination in the optical detector array 150</u>. (<u>Emphasis added</u>.)

The overlay code as a leading edge on each packet or wavelengths that contain a parallel word holding four pieces of information, as described below. When the marker channel light pulses of marker channel 12, are converged with the DWDM channels, encoded states of 1 and 0 bits will be processed by sensors of the parallel optical code detector 204.

> [0079] The incoming signal is a DWM type signal with a code overlaid on some or all of the wavelength channels similar to the signal shown in FIG. 5. <u>Specifically, the parallel overlay format code has a leading edge on each packet or wavelengths which contain a parallel word holding four pieces of information: 1) the wavelength channel number; 2) the packet length; 3) the amount of open bandwidth after this packet; and 4) the destination address of the packet</u>. A small portion of the DWDM light signal is tapped from the input fiber 202 by a tap line 212 and routed to the parallel optical code detector 204.

> The marker channel 132 in FIG. 5 runs along normal DWDM channels and has a specific wavelength. When the marker channel light pulses are converged with the DWDM channels, encoded states of ONE and ZERO bits will immediately be processed by the sensors of the parallel optical code detector 204. (Emphasis added.)

The Examiner states in the Office Action that, "and said at least one optical identifier (¶0079 in which the marker channel (optical identifier) and the at least one main optical signal, form a parallel word (relationship) holding vital information (e.g. destination address, channel number, open bandwidth after channel, packet length), when the two signals are detected for the purpose of verifying if the packet has been routed properly (whether or not a correct transmission route has been established), e.g. ¶0077 match the overlay code with the detector to see if the destination is correct, ¶069 redirect the optical packet based on overlay coding (marker channel))."

However, Applicant contends that Chow fails teach or suggest, "*at least one set of corresponding data, which include a first relationship in correspondence between said at least one main optical signal and said at least one optical identifier*."

Chow discloses that the only relationship between the pulse signal of marker channel 12 and the parallel overlaid format code of channel 11 is to indicate to reference detectors 176 when to process the parallel overlaid format code to determine "a proper code."

The Office Action fails to address, and Chow fails to teach or suggest *at least one set of corresponding data*, which includes *a first relationship in correspondence* between the data in the data channels 1-11 and the pulse signal of marker channel 12.

Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art reference fails to teach or suggest each and every element and feature of Applicant's claimed invention.

B. The 35 U.S.C. § 103(a) Rejection over Chow et al., U.S. Pat. App. Pub. No. 2002/0145776

The Examiner alleges that Chow et al., U.S. Pat. App. Pub. No. 2002/0145776, (Chow), makes obvious the invention of claims 18-20, 35-37 and 52-56.

Applicant submits, however, that Chow fails to teach or suggest, "*wherein said at least one optical signal receiver further verifies whether a correct transmission route is established, based on said at least optical identifier with reference to at least one set of corresponding data, which include a first relationship in correspondence between said at least one main optical signal and said at least one optical identifier*," of independent claims 1, 21, 38, 57 and 71-72.

See Applicant's above arguments with respect to section **A.**, where Applicant contends that Chow fails teach or suggest, "*at least one set of corresponding data, which include a first relationship in correspondence between said at least one main optical signal and said at least one optical identifier*."

Chow discloses that the only relationship between the pulse signal of marker channel 12 and the parallel overlaid format code of channel 11 is to indicate to reference detectors 176 when to process the parallel overlaid format code to determine "a proper code."

The Office Action fails to address, and Chow fails to teach or suggest *at least one set of corresponding data*, which includes *a first relationship in correspondence* between the data in the data channels 1-11 and the pulse signal of marker channel 12.

Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art reference fails to teach or suggest each and every element and feature of Applicant's claimed invention.

C. Newly Added Independent Claims 75-79 with Respect to the Applied Prior Art References

Applicant adds new claims 75-79 to provide more protection for the claimed invention and to claim additional features of invention. These claims are independently patentable because of the novel features recited therein.

Applicant maintains that new claims 75-79 are patentable over any combination of the applied references at least for analogous reasons to those set forth above with respect to claims 1-74, and that the indicated allowable subject matter of claims 2, 28, 40, 58 and 73 has been incorporated into claims 75-79, respectively.

Therefore, none of the cited prior art references nor any alleged combination thereof teaches or suggests these features of Applicant's claimed invention with respect to newly added claims 75-79.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-79, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: March 19, 2007

Donald J. Lecher

Donald J. Lecher, Esq.
Reg. No. 41,933
Sean M. McGinn, Esq.
Reg. No. 34,386

McGinn Intellectual Property Law Group, PLLC
8321 Old Courthouse Rd., Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254